

Interview Summary	Application No.	Applicant(s)	
	10/056,437	CHO ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

All participants (applicant, applicant's representative, PTO personnel):

(1) Shun Lee. (3)_____.

(2) Ross Christie (47492) 203-777-6628. (4)_____.

Date of Interview: 18 September 2006.

Type: a) ☐ Telephonic b) ☐ Video Conference
c) ☒ Personal [copy given to: 1) ☐ applicant 2) ☒ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.
If Yes, brief description: _____.

Claim(s) discussed: 1.

Identification of prior art discussed: none.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: discussed proposed claim amendments.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

1. (currently amended) A materialization method of a photo detect device, wherein channels for transferring carriers are set by heterointerfaces and impurity doping and magnitude of currents which flow through the channels is determined by controlling Fermi level, comprising the steps of:

forming at least one quantum dot layer which includes a plurality of quantum dots at predetermined positions proximate to the channels not only for carriers in the quantum dots to be released in response to incident light and accumulated in the channels but also for carriers in a contact layer to be drawn to the channels until the vacancy of the quantum dots, which is originated by release of carriers, is refilled by other carriers wherein the electron-flow through the quantum dot layer is blocked by at least the formation of the quantum dots formed in the quantum dot layer; and

providing the Fermi level at an activation position by confining the carriers within the quantum dot layers while limiting the number of the carriers in the channels for the purpose of minimizing a current flow in the absence of incident light.

2. (original) A materialization method as set forth in claim 1, wherein the light is infrared light ranging, in wavelength, from 0.77 μm to 100 μm .

3. (currently amended) A photo detect device, wherein channels for transferring carriers are set by heterointerfaces and impurity doping, comprising:

at least one quantum dot layer containing a plurality of quantum dots located at predetermined positions proximate to the channels in at least one conduction path layer for the

carriers in the quantum dots to be released in response to incident light and accumulated in the channels and to influence the potential of the channels in such a manner that carriers be drawn to the channels from a contact layer;

at least one light absorption layer containing the at least one quantum dot layer, which is formed by alternating the quantum dot layer and a material different in band gap from the quantum dot layer;

the at least one conduction path layer, in which carriers excited in the light absorption layers are collected and conducted in a horizontal direction which is parallel to the at least one conduction path layer;

at least two detect electrodes for conducting in the horizontal direction the carriers which are accumulated in the channels in response to the light incident on the at least one light absorption layer, the two electrodes are formed at respective end portions of the quantum dot layer, wherein the electron-flow through the quantum dot layer is blocked by at least the formation of the quantum dots ~~formed~~ in the quantum dot layer; and

the contact layer on which the detect electrodes are formed to collect and to provide the carriers for the quantum dots.

4. (original) A photo detect device as set forth in claim 3, wherein the at least two detect electrodes have a distance therebetween which is longer than the wavelength of the incident light in the device.

5. (previously presented) A photo detect device as set forth in claim 3, further comprising at least one impurity-containing layer, wherein the distribution of impurities in

the at least one impurity-containing layer take a shape of a delta function.

6. (previously presented) A photo detect device as set forth in claim 3, wherein the at least one impurity-containing layer have a uniform distribution of the impurities therethrough and are etched to control the number of carriers provided to the quantum dots.

7. (previously presented) A photo detect device as set forth in claim 5, wherein the at least one impurity-containing layer and the at least one light absorption layer are formed adjacent to the at least one conduction path layer.

8. (previously presented) A photo detect device as set forth in claim 5, wherein the at least one impurity-containing layer and the at least one light absorption layer are formed to be overlapped with the at least one conduction path layer.

9. (previously presented) A photo detect device as set forth in claim 5, wherein the at least one impurity-containing layer, the at least one conducting path layer and the at least one light absorption layer are made to have different band gaps so as to be subjected to heterostructures.

10. (previously presented) A photo detect device as set forth in claim 5, further comprising at least one control electrode for controlling the amount of the carriers provided to the at least one light absorption layer and the at least one conduction path layer.

11. (previously presented) A photo detect device as set forth claim in 10, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below a bottom layer of the at least one control electrode, to reduce leak currents of the at least one control electrode.

12. (previously presented) A photo detect device as set forth claim in 10, wherein a highly resistant layer is provided below a bottom layer of the at least one control electrode to reduce leak currents of the at least one control electrode.

13. (original) A photo detect device as set forth in claim 10, wherein at least two control electrodes are used and provided sequentially with electric fields different in magnitude, so as to detect the carriers accumulated in the channels beneath the at least two control electrodes, in sequence.

14. (original) A photo detect device as set forth in claim 13, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below a bottom layer of the at least two control electrodes, to reduce leak currents of the at least two control electrodes.

15. (previously presented) A photo detect device as set forth in claim 13, wherein a highly resistant layer is provided below a bottom layer of the at least two control electrodes to reduce leak currents of the at least two control electrodes.

16. (original) A photo detect device as set forth in claim 13, wherein the at least two control electrodes are formed into at least two layers lest the control electrode in one layer may overlap with that in another layer, a matter with a large resistance is interposed between the at least two control electrode layers, and electric fields different in magnitude are subsequently applied to the at least two control electrodes, whereby the charges accumulated in the channels beneath the at least two control electrodes can be, in sequence, detected.

17. (previously presented) A photo detect device as set forth in claim 16, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below a bottom layer of the at least two control electrodes, to reduce leak currents of the at least two control electrodes.

18. (original) A photo detect device as set forth in claim 16, wherein a highly resistant layer is provided below a bottom layer of the at least two control electrodes to reduce leak currents of the at least two control electrodes.

19. (currently amended) A method for fabricating photo detect device, comprising the steps of:

growing light absorption layers in such a way that quantum dots are naturally formed in the course, wherein said absorption layers contain a plurality of quantum dots and are located at predetermined positions proximate to channels not only for carriers in the quantum dots to be released from the quantum dots in response to incident light and accumulated in

the channels but also for carriers in a contact layer to be drawn to the channels;

depositing at least two electrodes on the contact layer to show horizontal conduction, the two electrodes are formed at respective end portions of the light absorption layers, wherein the electron-flow through the light absorption layers is blocked by at least the formation of the quantum dots ~~formed~~ in the light absorption layers;

reducing the resistance between the electrodes and the contact layer;

etching the edge of the device to an extent necessary to reduce an electrical connection to other neighboring devices;

etching the contact layer and/or a carrier supplying layer to a depth necessary to control the amount of carriers provided to the quantum dots;

depositing at least one control electrode for controlling carriers provided to the quantum dots;

depositing an insulating film to prevent a short circuit from being formed between the electrodes; and

etching a predetermined portion of the insulating film to transfer desired signals.

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FAX COVER LETTER

TO: Examiner Shun K. Lee FROM: Ross J. Christie

FAX NO.: (571) 273-2439 DATE: September 13, 2006

YOUR REF.: U.S. Pat. Appl. No. 10/056,437 OUR REF.: 02-112

PAGES: 8 including this sheet

Confirmation Copy to Follow: Yes x No

Comments:

Please see the Applicant Initiated Interview Request Form and set of proposed claim amendments for meeting scheduled on September 18, 2006.

Please acknowledge receipt of this letter by telephone or telefax and advise us if any pages are not readily legible or have not been received.

The information contained in this communication is confidential, may be attorney-client privileged, may constitute inside information, and is intended only for the use of the addressee. Unauthorized use, disclosure or copying is strictly prohibited and may be unlawful. If you have received this communication in error, please notify us immediately and destroy this transmittal.

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PTOL-413A (09-04)
Approved for use through 07/31/2006. OMB 0531-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 10/056,437 First Named Applicant: Taehee Cho
Examiner: Lee, Shun K. Art Unit: 2884 Status of Application: Final Action

Tentative Participants:

(1) Ross J. Christie (2) Examiner Lee
(3) _____ (4) _____

Proposed Date of Interview: September 18, 2006 Proposed Time: 9:30 (AM/PM)

Type of Interview Requested:

(1) ☐ Telephonic (2) ☒ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☒ NO

If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rej. 112</u>	<u>Claims 1-19</u>	<u>-</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Continuation Sheet Attached					

Brief Description of Arguments to be Presented:

Applicants submit a set of proposed claim amendments for discussion with Examiner Lee to address an outstanding §102 rejection and potential future §102/§103 rejections.

An interview was conducted on the above-identified application on 9/18/06.

NOTE: This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

Ross J. Christie
Applicant/Applicant's Representative Signature

Ross J. Christie

Typed/Printed Name of Applicant or Representative

47,492

Registration Number, if applicable

Shun K. Lee
Examiner/SPE Signature

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.